Occupational Patterns of Opioid-Related Overdose Deaths Among Arizona Medicaid Enrollees, 2008–2017

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INTRODUCTION

Nearly 400,000 individuals died from opioid overdose in the USA from 1999 to 2017.¹ Understanding the populations most affected is crucial to developing targeted interventions. Prior studies examining occupational patterns of opioid-related overdose deaths were limited because they did not examine unpaid occupations potentially relevant to opioid overdose (e.g., homemakers, students, unemployed) or changes in occupational patterns over time.^{2–4} We aimed to more comprehensively examine occupational patterns of opioid-related overdose deaths among Arizona Medicaid enrollees with opioid prescriptions from 2008 to 2017. Over that time period, opioid-related overdose deaths in Arizona sharply increased from 586 in 2008 to 949 in 2017.⁵

METHODS

We identified Arizona Medicaid enrollees aged 18–64 years who filled any opioid prescriptions and died from accidental opioid-related overdose from 2008 to 2017. We identified opioid-related overdose deaths in death certificates using *International Classification of Diseases, Tenth Revision* (ICD-10) underlying cause-of-death codes X42, X44, Y12, and Y14 for accidental and undetermined overdose and multiple cause-of-death codes T40.1 (heroin), T40.2 (natural and semisynthetic opioids), T40.3 (methadone), and T40.4 (synthetic opioids other than methadone).

We extracted age, year of death, occupation, gender, race, overdose type (heroin-related, synthetic opioid-related), and co-morbid drug use (other substances involved in the

overdose) from death certificates. We classified individuals' occupations based on the Bureau of Labor Statistics' 2018 Standard Occupational Classification (SOC) system. We created four additional occupational categories not part of the classification system: homemakers; caregivers; students and volunteers; and unemployed, never worked, and disabled. For each occupational group, we calculated the number of opioid-related overdose deaths in each year and described demographic characteristics and proportion with heroin-related overdose deaths, synthetic opioid-related deaths, and co-morbid drug use.

RESULTS

From 2008 to 2017, 2339 eligible Arizona Medicaid enrollees died from opioid-related overdose, with 644 unique occupations and 148 individuals of unknown occupation. Overall, the mean age at death was 41 (SD = 12) years, with 58% male, 66% White, 15% Hispanic, 32% involving heroin, 13% involving synthetic opioids, and 40% involving co-morbid drug use (Table 1).

The gender and race distribution and proportion with heroin-related death varied substantially across occupations. Males were especially predominant among construction and extraction (> 95%); installation, maintenance, and repair (> 95%); and architecture and engineering occupations, but minimal among homemakers, healthcare support occupations, and caregivers. Non-Hispanic Whites were prominent in overdose deaths among computer and mathematical (88%) and business and financial operations (81%) occupations, but low among caregivers (38%). Of all opioid-related overdose deaths, heroin-related deaths were more common among construction and extraction occupations (42%); arts, design, entertainment, sports, and media (40%); and building and grounds cleaning occupations (50%), but uncommon in occupations such as homemakers, business/financial, and legal occupations (Table 1). The percentage with non-opioid co-morbid drugs involved in the cause of death was between 32 and 46% across occupations.

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Table 1 Opioid-related overdose deaths among Arizona Medicaid enrollees with opioid prescriptions, mean age at death, gender and race distribution, and proportion of heroin-related overdose deaths, by occupational group, 2008-2017

Occupational Group	Representative occupations	Total opioid-related overdose deaths	Mean age at death (SD)	% Male	% Non-Hispanic White†	% Heroin-related overdose deaths	% Synthetic opioid-related overdose deaths (except methadone)	% Co-morbid, non-opioid drug use**
Homemakers*	homemaker, housewife	262	42 (11)	†	58	16	14	38
Construction and Extraction	brickmason, roofer	233	44 (12)	>95	66	42	9	44
Transportation and Material Moving	bus driver, general laborer	197	42 (12)	91	56	40	13	40
Sales and Related	cashier, sales agent	179	40 (12)	61	68	31	15	43
Food Preparation and Serving Related	chef, waiter	166	39 (12)	50	75	33	14	44
Office and Administrative Support	customer service, teller	139	41 (12)	32	62	24	14	35
Management	chief executive, hotel manager	131	42 (11)	66	69	31	12	36
Installation, Maintenance, and Repair	car mechanic, locksmith	127	43 (11)	>95	71	40	11	39
Unemployed, Never Worked, Disabled*	disabled, unemployed	102	36 (12)	63	55	39	12	44
Students, Volunteers*	college student, volunteer	88	27 (8)	49	65	40	13	40
Healthcare Practitioners and Technical	physician, registered nurse	72	44 (10)	33	79	†	21	32
Healthcare Support	dental assistant, orderly	69	43 (11)	†	71	22	16	36
Production Arts, Design, Entertainment, Sports, and Media	butcher, machinist	64	45 (12)	83	59	41	†	42
Building and Grounds Cleaning and Maintenance	actress, photographer	62	42 (12)	74	77	44	†	40
Personal Care and Service	custodian, landscaper	58	43 (13)	71	53	50	†	43
Caregivers*	barber, personal trainer	41	38 (12)	29	68	29	†	41
Community and Social Service	caregiver, caretaker	37	44 (13)	†	38	†	†	43
Business and Financial Operations	priest, social worker	36	41 (12)	58	67	39	†	39
Protective Service	accountant, loan officer	32	43 (8)	56	81	†	†	34
Educational Instruction and Library	firefighter, security guard	24	42 (12)	†	79	†	†	46
Computer and Mathematical	curator, high school teacher,	19	43 (10)	†	68	†	†	†
Architecture and Engineering	data architect, web developer	16	40 (9)	†	88	†	†	†
Legal	architect, electrical engineer	†	46 (11)	†	†	†	†	†
Farming, Fishing, and Forestry	attorney, legal assistant	†	51 (7)	†	†	†	†	†
Military	combine operator, farmworker	†	40 (7)	†	†	†	†	†
Life, Physical, and Social Science	artillery officer, infantryman	†	36 (12)	†	†	†	†	†
	economist, physicist	†	50 (3)	†	†	†	†	†

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Table 1. (continued)

Occupational Group	Representative occupations	Total opioid-related overdose deaths	Mean age at death (SD)	% Male	% Non-Hispanic White‡	% Heroin-related overdose deaths	% Synthetic opioid-related overdose deaths (except methadone)	% Co-morbid, non-opioid drug use**
Unknown	—	148	48 (10)	71	73	42	†	41
All Opioid Overdose Deaths	—	2339	41 (12)	58	66	32	13	40

Data Source: Arizona Department of Health Services and Arizona Health Care Cost Containment System, 2019. Note: The Center for Health Information & Research is the source for all processing of the ADHS and AHCCCS data.

*Occupational group is a non-standard group added to the Bureau of Labor Statistics 2018 Standard Occupational Classification.

**Co-morbid drug use was identified by T codes corresponding to cocaine (T40.5), psychostimulants (T43.6), benzodiazepines (T42.4), cannabis (T40.7), lysergide (T40.8), or other psychodyspleptics (T40.9), as indicated in the cause of death in death certificates.

†Data suppressed due to insufficient cell size.

‡Other races not presented due to insufficient cell size. Blacks were 4%, Hispanics were 15%, and Native Americans were 3% of all opioid overdose-related deaths

Figure 1 shows the occupations with the most opioid-related overdose deaths from 2008 to 2017. Overall, opioid-related overdose deaths were consistently high among construction and extraction workers and homemakers over time. The number of opioid-related overdose deaths increased in recent years among transportation and material moving occupations, the group with the most deaths in 2017 ($n = 51$).]—>

DISCUSSION

This study offers unique demographic insights into opioid-related overdose deaths among Medicaid enrollees with opioid

prescriptions. We identified a previously unexamined occupational group—homemakers—that is consistently among the highest levels of opioid-related overdose deaths in this population. Additionally, by tracking occupational patterns year-to-year, we identified the recent rapid increase in the number of opioid-related overdose deaths among transportation and material moving occupations.

Our study has several limitations. First, occupations were identified from death certificates without further validation. Second, we are not able to examine whether observed patterns were associated with changes in Medicaid enrollment, occupational distributions among Medicaid enrollees, or opioid prescribing patterns. Finally, our findings focus on Arizona

Fig. 1 Number of opioid-related overdose deaths among Arizona Medicaid enrollees with opioid prescriptions, by occupational group and year. The top 5 occupations each year are listed, 2008–2017. Data Source: Arizona Department of Health Services and Arizona Health Care Cost Containment System, 2019. Note: The Center for Health Information and Research is the source for all processing of the ADHS and AHCCCS data. The number in each circle represents the number of opioid-related overdose deaths for that occupation in a given year. Unknown occupations were excluded from this ranking

*Data on number of opioid-related overdose deaths was suppressed for all occupations in 2008 and management occupations in 2009 due to insufficient cell size

Medicaid beneficiaries with opioid prescriptions and have limited generalizability to other populations.

Nevertheless, these findings identify several occupational groups strongly affected by fatal opioid overdose and offer additional demographic insight that could inform targeted interventions, from targeting naloxone distribution to work sites of high-risk occupations, to increasing licensing or educational requirements around opioids in certain fields, to additional interventions that might target those unpaid occupations we identify in this study.

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Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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